Additional Fees:

Enclosed herewith is a check for $215 to cover the cost of a one month extension of time and a Notice of Appeal. No additional fees are believed to be required. However, should it be determined that any additional fees are due, please contact the undersigned attorney for immediate remittance of any such fees.

REMARKS

In the last Office Action, claims 17-23 and 25-36 were rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of US Patent 5,156,321 to Liburdi et al ("Liburdi"). The Action was made Final.

By this response, independent claims 17 and 27 have been amended to more clearly distinguish the claimed invention from the prior art. The claim amendments add the limitation of "an edge area comprising" to very clearly define the precise area of a workpiece to which the inventive process is pertaining.

Applicant respectfully submits that the entry of this amendment after final will not require any further search or impose any undue burden on the PTO staff, accordingly, entry of this amendment is most respectfully requested.

The present invention pertains to a method of forming a metal product having an edge area comprising a cutting edge. The cutting edge is formed, in accordance with the present invention, having a wear resistant surface with superior sharpening and sharpened edge holding characteristics. In accordance with the present invention, a workpiece substrate is provided having an edge area comprising a cutting edge portion. A high-density coating process is used to coat the cutting edge portion of the workpiece substrate with a wear resistant coating material. A hot isostatic pressing treatment is performed on the coated workpiece substrate to obtain a metal product having a wear resistant surface comprised of the coating material. The wear resistant surface is formed at the cutting edge portion having diffusion bonding between the coating material and the workpiece substrate. The diffusion bond overcomes the drawbacks of prior cutting tools by providing a wear resistant and

edge holding cutting edge that becomes an integral part of the cutting tool substrate. The cutting edge portion is sharpened so that the diffusion bonding between the coating material and the workpiece substrate retains the wear resistant coating material on the cutting edge portion. In accordance with the present invention, the drawbacks of the prior art are overcome because the wear resistant coating is diffusion bonded and thus retained during the sharpening process of the cutting edge portion and during use of the cutting edge portion of the formed metal product.

The relevant teachings of Liburdi can be summarized as follows:
(1) Clean the surface of the articles to be repaired or joined in the region of the *joint*;
(2) Fill the *void* in the *joint* with a powdered metal;
(3) Perform solid state sintering of the powder to form a *porous* metallic structure in the joint or repair area;
(4) Apply a layer of braze alloy;
(5) Heat in a vacuum to melt braze alloy and draw it into the porous metallic structure;
(see, Col. 2, line 50 through Col. 3, line 11).
(6) Finally, hot isostatic pressing can be used to close any minor internal porosity. (see, Col. 4, lines 30-31).

As described in the text and as clearly illustrated in the drawings of the Liburdi patent, this reference teaches in every example that a void is filled with material. There is no edge area comprising a

cutting edge portion. Liburdi fills the void and at the end of the described process has a flat, planer surface - there is no suggestion of performing the process taught by Liburdi to an edge area at all, the process described by Liburdi is for the purpose of joining two pieces of metal together. In accordance with the teaching of Liburdi, the end result is always a flat, planer surface. In fact, the grinding operation performed by Liburdi is specifically performed to obtain this flat planer surface, and specifically not to form a sharpened edge.

The claimed invention has been rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Liburdi. It is well settled that "when applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

(A) The claimed invention must be considered as a whole;
(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
(D) Reasonable expectation of success is the standard with which obviousness is determined.
Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986)." (see, MPEP Section 2141).

Applicant respectfully submits that in making the obviousness rejection, the examiner is improperly viewing the references with the hindsight vision afforded by the claimed invention. The claimed invention results in a cutting edge that is superior to the cutting edges described in the admitted prior art. Liburdi teaches a method for filling a void, and has nothing to do with forming a cutting edge.

The examiner states that Liburdi discloses that an outer edge portion of a product (e.g., a turbine blade) is subjected to a grinding process, and further states that the grinding process can be considered analogous to an edge sharpening process.

Applicant's respectfully disagree with these statements. The process performed by Liburdi cannot be performed at an edge area. The process requires powdered metal applied to a joint to *fill a void.* In further support of this, the drawings in Liburdi always show the powdered metal filled into a void. In direct contract, in accordance with the present invention, a high density coating process is used to coat the cutting edge portion of the workpiece substrate. It appears from the description and drawings of Liburdi that a grinding

operation if performed to remove excess material formed in the filling of the void, in the area of the filled void, so as to obtain a joint with a flat planar surface (see, for example, Fig. 2(e) and Col. 4, lines 65-68). The grinding operation is not analogous to an edge sharpening process, in the teaching of Liburdi there is no sharpening and there is no edge.

Applicant respectfully submits that the admitted prior art does not provide any motivation for looking to a method of repairing a void or joining two pieces of metal for a solution to the problems of the conventionally formed cutting edges. Nor does the teaching of Liburdi provide any motivation for using a method of joining metals and filling voids to overcome the wear problems of cutting edges.

As discussed in the specification on page 5, lines 5-17, the admitted prior art refers to a wear resistant coating applied to a cutting edge by the Chemical Vapor Deposition method so that the entire tool bit substrate receives an even, thin film of a relatively hard material, such as Carbide, Cobalt or TiN. Since the coating adheres to the tool bit substrate via a mechanical bond located at a boundary interface,

flaking and chipping of the coating off the substrate is likely to occur during use, limiting the service life of the tool bit. The admitted prior art also refers to the tool bit having a fixed wear resistant cutting tip. In this case, a relatively hard metal cutting tip is fixed to the relatively soft tool bit substrate. The metal cutting tip, which is typically comprised of a Carbide or Cobalt alloy, is fixed to the tool bit substrate by brazing. During extended use the tool bit is likely to fail at the relatively brittle brazed interface between the metal cutting tip and the tool substrate, and again, the useful service life of the tool bit is limited.

The admitted prior art does show that it was known to apply a material that has wear resistant properties to a tool bit blank by chemical vapor deposition. The admitted prior art shows that is has been known to affix a wear resistant cutting tip by brazing or depositing a thin film of wear resistant material. However, as described in this passage from the Background of the Invention, "the coating adheres to the tool bit substrate mostly via a mechanical bond located at a boundary interface, flaking and chipping of the coating off of the substrate is likely to occur during

use". Further, in the case of an affixed cutting tip, "the tool bit is likely to fail at the relatively brittle brazed interface between the metal cutting tip and the tool substrate". These problems are consistently encountered with the conventional solutions for providing a wear resistant surface to the sharpened edge of a cutting tool. These problems were recognized by the applicant and a solution to these problems provide by the claimed invention. The solution, as clearly defined by the claims, is directed to forming a coating at the *sharpened edge* of a cutting tool, such as a kitchen knife.

Liburdi, on the other hand, in relevant part clearly teaches a process by which a *void* can be filled. This void is either a joint between metal items to be joined or a void, such as a crack in a substrate. There is no suggestion in this reference that would have motivated one of ordinary skill in the art to overcome the drawbacks of cutting tools by forming a wear resistant diffusion coating on the surface of a cutting *edge*, without the improper hindsighted application of the claimed invention. There is no recognition in the Liburdi reference to any of the problems associated with cutting tools that become

dull. This reference only teaches a method for filling a void, when the void is filled there is no cutting edge but rather a solid piece of metal. The admitted prior art, on the other hand, shows that mechanical bonding between a wear resistant coating or insert is typically used to adhere the wear resistant element to a cutting tool substrate. It is this mechanical bonding that results in the eventual loss of the wear resistant element. There is no suggestion in the admitted prior art to anything other than a mechanical bond between a cutting tool substrate and a wear resistant element.

Applicant respectfully submits that there is nothing in any of the prior art, including the admitted prior art and the Liburdi patent, that would suggest forming a diffusion bond at the cutting edge portion of a cutting tool so that the tool can have a superior sharpening characteristic.

Applicant respectfully submits that the claims presented herein are patentably distinguished from the AAPA and the cited reference. Accordingly, applicant respectfully submits that the claims of the present application are allowable over the prior art. In view of the foregoing, entry of this amendment, favorable reconsideration and allowance of the claims of the application are most respectfully requested. The Examiner is invited to contact the undersigned by telephone if there are any questions or suggestions regarding the present application.

Respectfully submitted,

June 16, 2003

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MAILING CERTIFICATE

Date of Deposit: June 16, 2003

I hereby certify that this correspondence is being deposited with the United States Postal Service as "First Class Mail" on the date indicated above in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231.

John J. Daniels
Reg. No. 34, 808

Smooth Claims:

17) A method of forming a metal product having an edge area comprising a cutting edge having a wear resistant surface, comprising the steps of: forming a workpiece substrate having an edge area comprising a cutting edge portion; performing a high-density coating process to coat at least the cutting edge portion of the workpiece substrate with a wear resistant coating material; performing a hot isostatic pressing treatment on the coated workpiece substrate to obtain a metal product having a wear resistant surface comprised of the coating material, the wear resistant surface being formed at the cutting edge portion and having a diffusion bonding between the coating material and the workpiece substrate; and sharpening the cutting edge portion so that the diffusion bonding between the coating material and the workpiece substrate retains the wear resistant coating material on the cutting edge portion during the sharpening process of the cutting edge portion and during use of the cutting edge portion of the formed metal product.

27) A method of forming a kitchen knife having an edge area comprising a cutting edge having a wear resistant surface, comprising the steps of: forming a knife substrate having an edge area comprising a cutting edge portion; performing a high-density coating process to coat at least the cutting edge portion of the knife substrate with a wear resistant coating material; performing a hot isostatic pressing treatment on the coated knife substrate to obtain a kitchen knife having a wear resistant surface comprised of the coating material, the wear resistant surface being formed at the cutting edge portion and having a diffusion bonding between the coating material and the knife substrate; and sharpening the cutting edge portion so that the diffusion bonding between the coating material and the knife substrate retains the wear resistant coating material on the cutting edge portion during an edge sharpening process of the cutting edge portion and during use of the cutting edge portion of the formed kitchen knife.